

Chamberlin from Japan, the preponderance of similarities indicates that they are probably congeneric. The type of *A. shintoisticus* is a female, so no comparison can be made of the secondary sexual characters.

Allochthonius incognitus is readily distinguished from *A. shintoisticus* by the chaetotaxy of the carapace, which is 8:4:24 in the latter. The chela, coxal spines, and intercoxal tubercle of *A. shintoisticus* (Figs. 6, 7, 8) have been illustrated to provide a comparison between the two species.

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Notes on *Arcynopteryx (Oroperla) barbara* (Needham) (Plecoptera)

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More than 30 years ago the late James G. Needham described the nymph of this moderately large Californian stonefly with peculiar lateral abdominal gills (Needham, 1933). Despite efforts by several aquatic biologists to find the adult, none was found until I collected an adult male in 1964 from a bridge over the upper Truckee River. In 1965 two additional males were taken from a bridge over the upper reaches of the Yuba River. Below is a description of the male, designation of a holotype, and a few observations of captive nymphs made by Stephen W. Hitchcock, who has permitted me to present them. The drawings of head and pronotum and male genitalia were made by Alan V. Nebeker. Financial assistance for a part of the research upon which this paper is based was furnished by the National Science Foundation through grant GB-3726.

MALE.—Length to wing tips 21–22 mm. Length of body 18–19 mm. Length of antennae 15–16 mm. Length of cerci 14–15 mm. General color brown with hyaline wings. Head blackish with prominent yellow spot, bell- to diamond-shaped, within ocellar triangle behind which is a median large crescent-shaped yellow spot at rear of head (Fig. 1). M-line yellow or at least partly so. Dull yellow area forward of anterior ocellus. Pronotum dark brown with median yellow stripe about as wide as diameter of fore tibia; mesonotum with large, wide, yellow spot; metanotum wholly brown. Mesosternal Y-ridge extends to posterior corners of furcal pits. Antennae dark brown. Cerci light brown. Legs mostly light brown with irregular buff or dull yellow band distally on femori. Wings (Fig. 3) distally usually with several crossveins. Venter of thorax and abdomen dark brown medially, progressively darker posteriorly to solid brown ninth sternite; tenth sternite grades from dark brown to light buff distally. Laterally, venter of thorax and first six or seven abdominal segments, and coxae and gills, buff to white. Gills located as follows: submental pair slender, fingerlike; cervical pair, stubby; double vermiform pair laterally between pro- and mesothorax; double vermiform pair laterally between meso- and metathorax; single vermiform pair laterally from sides of tergites on first seven abdominal segments. First nine tergites brown. Tenth tergite wholly cleft, distally forming pair of slender, inwardly directed, hairy lobes that cross each other. Aedeagus with large, heavily sclerotized basal anchor from which heavily sclerotized, slender paragenital plates extend upward and slightly rearward; slender stylets heavily sclerotized; epiproct long and slender, distal third of which is sharply bent (Fig. 2); translucent cowl (not shown in Fig. 2) over stylets and epiproct.

Holotype male, paratype male.—YUBA RIVER, U. S. HIGHWAY 80 AT UPPERMOST BRIDGE, AT ABOUT ELEVATION 6,000 FEET, NEVADA COUNTY, CALIFORNIA, 8 June 1965, S. G. Jewett, Jr. An additional paratype male has the following data: Upper Truckee River, U. S. Highway 50, bridge about one mile southwest of Myers, El Dorado County, California, 22 May 1964, S. G. Jewett, Jr. Holotype male deposited in the collections of the California Academy of Sciences, paratypes in my collection.

The gills in the adult of *A. barbara* are essentially similar to those of the nymph except that the short, stubby, unpigmented nymphal gills located laterally in front of the fore coxae are represented in the adult only by short stubs which are lightly pigmented. The gill arrangement in this species (and subgenus) readily separates it from other members of *Arcynopteryx*.

Associated with the male from the Upper Truckee River were adults of *Arcynopteryx* (*Perlinodes*) *aurea* Smith and *Arcynopteryx* (*Skwala*) *parallela* (Frison). Nymphs of the former were numerous in the river but I found none of *A. barbara*. Again, *A. aurea* adults were present on the highway bridge over the Yuba River where the two adult males of *A. barbara* were taken.

During the period 5–7 September 1954, Stephen W. Hitchcock found

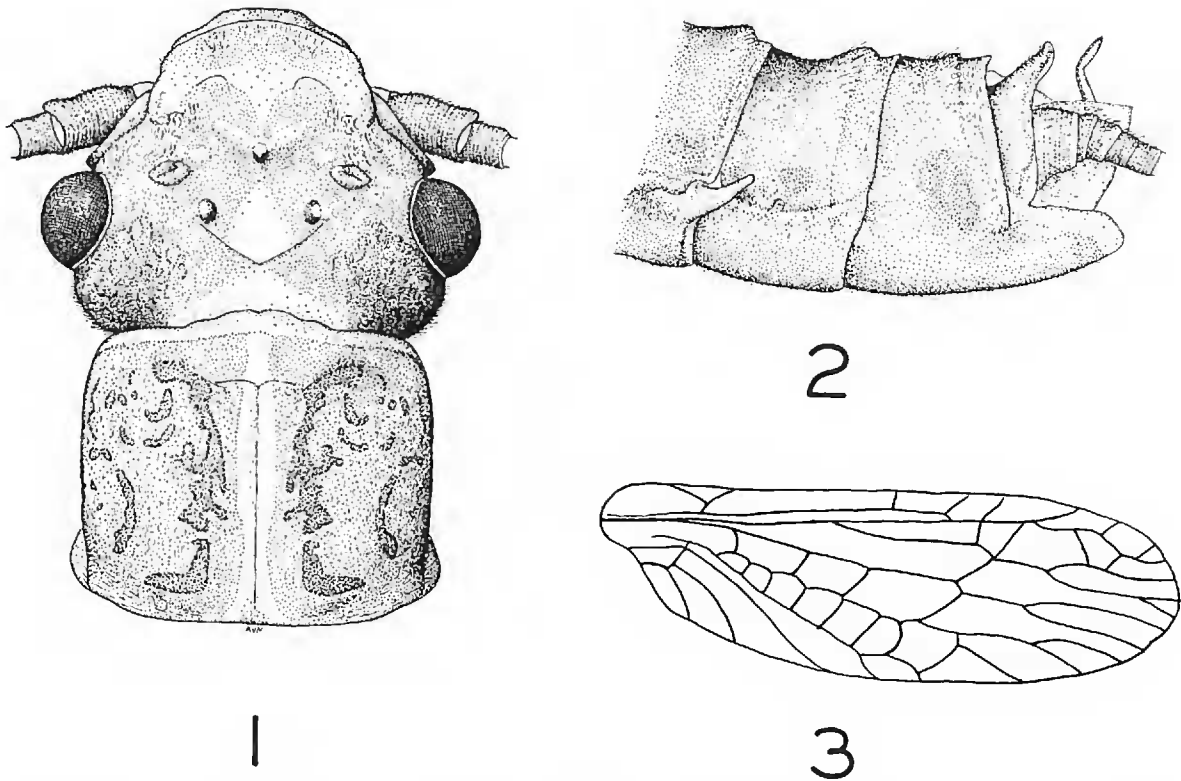


Fig. 1. *Arcynopteryx (Oroperla) barbara* (Needham), head and pronotum. Fig. 2, lateral view of male terminal abdominal segments. Fig. 3, forewing.

nymphs of *Arcynopteryx barbara* of two distinct sizes in Miller Creek, a tributary of Rubicon River which, in turn, is a tributary of the Middle Fork of the American River, a major tributary of the Sacramento River. Nymphs were also found in the Rubicon and in the South Fork of the American River. These localities are in the general vicinity of Lake Tahoe in Nevada, Placer and El Dorado counties, California.

Captive nymphs of *A. barbara* fed readily on small nymphs which they positioned endwise, either head- or tailfirst, and then consumed whole or nearly so. They were quite voracious and quickly attacked others of their kind as well as mayfly nymphs. Unlike the nymphs of *Acroneuria* which are able to secure firm footing on the smooth bottom of an enameled pan, the nymphs of *A. barbara* require more solid footing such as a rock or a leaf in order to eat. It is of interest that this Setipalpiian stonefly, like *Acroneuria californica* Banks, feeds during daylight. According to Brinck (1949, p. 163) Swedish Setipalpiian stonefly nymphs are strictly nocturnal.

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